SEMESTER EXAMINATION, DECEMBER -2022

Course Name:- B.Tech **Semester:- I**

Paper Name:- Engineering Physics **Paper Code:- TBS 101**

Time - 2 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 2 घण्टे + 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **04** marks. All questions are compulsory.
- Section B- Answer any **2 out of 4** given questions in maximum hundred **(150) words**. Each question carries **10 marks**.
- Section C- Answer any **2 out of 3** given questions in maximum five hundred **(250) words**. Each question carries **15 marks**.

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न **चार** अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड–ब में **चार** प्रश्नों में से किन्हीं **दो** प्रश्नों के उत्तर अधिकतम **डेढ़ सौ** (150) **शब्दों** में दें। प्रत्येक प्रश्न 10 अंक का है।
- खण्ड–स में **तीन** प्रश्नों में से किन्हीं **दो** प्रश्नों के उत्तर अधिकतम **ढाई सौ** (250) **शब्दों** में दें। प्रत्येक प्रश्न 15 अंक का है।

Section – A (खण्ड–अ)

Objective Questions(वस्तुनिष्ठ प्रश्न)

1. Answer all the following questions. **5×4=20**

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) According to Einstein's Special Theory of Relativity, laws of physics can be formulated based on

a) Inertial Frame of Reference
b) Non-Inertial Frame of Reference
c) Both Inertial and Non-Inertial Frame of Reference
d) Quantum State

ii) In the Fresnel's Biprism experiment, the two Coherent sources are obtained by

a) reflection
b) internal reflection
c) refraction
d) reflection and refraction both

iii) Magnetic field can be produced by _____

a) Conduction current
b) Displacement current
c) Both Current
d) It is produced naturally

iv) The wave function of free particle is?

a) plane wave
b) standing wave
c) stationary wave
d) longitudinal wave

v) Which of the following is an example of optical pumping?

a) Helium-Neon laser
b) Semiconductor laser
c) Dye laser
d) Ruby laser

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Section – B (खण्ड–ब)
Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any two of the following questions in maximum 150 words. **10×2=20**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 150 शब्दों में दें।

i) **(a)** Describe the Young's double slit experiment with proper diagram.

(b) What is Polarization and Polarisation by reflection?

ii) **(a)** Explain the Einstein's mass energy equivalence.

(b) Describe the Laplace's equation for electrostatic potentials. Also, explain the continuity equation.

iii) **(a)** Write down the differential and integral form of Maxwell's equation.

(b) Explain the continuity equation and Poynting theorem.

iv) **(a)** Write short note on de-Broglie hypothesis, phase velocity and group velocity.

(b) Derive the relation between the Einstein's A and B coefficient.

Section – C (खण्ड–स)
Descriptive Questions (विवरणात्मक प्रश्न)

3. Answer any two of the following question in maximum 250 words. **2×15=30**
निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर अधिकतम 250 शब्दों में दें।

i) **(a)** Describe the Interference in a wedged-shaped thin film with proper sketch diagram.

(b) Explain in details the Michelson- Morley experiment with proper diagram.

ii) **(a)** Derive the expressions for the Lorentz space time transformations with proper sketch diagram. What is meant by relativistic time dilation?

(b) With the help of Maxwell equations, shows that $\vec{K}, \vec{H}, and\ \vec{E}$ are orthogonal to each other.

iii) **(a)** Deduce the expression for time dependent Schrodinger wave equations. Also, Find the probability that a particle trapped in a box L (100 Å) wide can be found between 0.45 L and 0.55 L for the ground state.

(b) What are the characteristics of laser light? Explain the working of He-Ne laser with sketch diagram.

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